

ISO KEY PROJECT:

7N-95-212
077774

EXPLORING THE FULL RANGE OF QUASAR/AGN PROPERTIES

NASA Grant NAGW-3134

Final Report

For the Period 1 June 1992 through 30 September 1997

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February 1998

Prepared for:

National Aeronautics and Space Administration
Washington, DC 20546

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The Smithsonian Astrophysical Observatory
is a member of the
Harvard-Smithsonian Center for Astrophysics

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The scientific work on this project continues and funding has been transferred to another grant ID. This report summarizes the status at the close out of the current grant.

Data Analysis

The PIA (PHOT Interactive Analysis) software was upgraded as new releases were made available by VILSPA. We have continued to analyze our data but, given the large number of still-out standing problems with the calibration and analysis (listed below), we remain unable to move forward on our scientific program. We have concentrated on observations with long (≥ 256 sec) exposure times to avoid the most extreme detector responsivity drift problems which occur with a change in observed flux level - ie. as one begins to observe a new target.

There remain a significant number of problems with analyzing these data including:

- the default calibration source (FCS) observations early in the mission were too short and affected by strong detector responsivity drifts
- the calibration of the FCS sources is not yet well-understood, particularly for chopped observations (which includes most of ours)
- the detector responsivity drift is not well-understood and models are only now becoming available for fitting chopped data
- charged particle hits on the detector cause transient responsivity drifts which need to be corrected
- the “flat-field” calibration of the long-wavelength (array) detectors: C100, C200 leaves significant residual structure and so needs to be improved
- the vignetting correction, which affects detected flux levels in the array detectors, is not yet available
- the intra-filter calibrations are not yet available
- The background above 60 microns has a significant gradient which results in spurious positive and negative “detections” in chopped observations.

As a result of these various problems, data analysis has proceeded slowly and we still do not have fluxes which are known well enough to address our main scientific questions.

Drs. Belinda Wilkes and Kim McLeod attended the workshop “Taking ISO to the Limits” at VILSPA, Spain in February. Dr. Wilkes presented initial results on low and high redshift quasars and discussed the problems which still remain in analyzing the data. They then visited the ISOPHOT data center in Heidelberg, Germany to discuss these problems and possible solutions with the ISOPHOT team.

This visit improved the situation for: removing transients, correcting for vignetting. We also put together a plan for subtracting the background in the C100 detector which will allow us to correct for the background gradient and the pixel-to-pixel variations in the detector.

We discussed the possibility of using DIRBE and IRAS data to provide an independent calibration of the background flux from 12–100 microns. Dr. Kim McLeod visited IPAC in July to discuss these latter two possibilities and we are currently investigating them further.

ISO Observation Planning

The ISOPHOT team have developed new recommendations for observing faint sources with ISHPOHT which involve small rasters rather than chopping. This was finalized around Feb 1997 and following this we re-designed the observations for the remainder of our observing time. We had put our program on hold in September when it became clear that chopped observations had major problems. The revised program, which included re-observation at long wavelengths using rasters for a number of high-priority targets and re-specification of new observations of others, was released in April 1997.

The latest prediction for the satellite lifetime has extended its life until April 1998. Our project has been allocated a 15% increase in our observing time as a result of this life extension. We have updated our ISO observing program both to make use of this additional time and to replace targets which have become invisible for the remainder of the ISO mission.

Conferences and talks

Dr. Wilkes presented invited colloquia entitled “The Infrared Continuum of Quasars” and STScI in June 1997 talk at the conference “Quasar Hosts” in Tenerife, Sept 1996 entitled “ISO Observations of Quasars and University of Nebraska, Lincoln in Oct 1997. She also presented a colloquium on “Quasars: A full view” at Wesleyan University in March 1997.

Ground-based Observing

Optical spectra have been partially reduced and the data organized. The flux calibration still needs to be completed. We submitted several proposals to the JCMT to observe the observed-frame mm spectral region just longward of the ISO energy bands in collaboration with David Hughes and James Dunlop at ROE. The first run on these sources has been completed but data reduction is not yet complete. We were unsuccessful in the second round of proposals.

Visitors and Collaborations

Drs Wilkes and Hooper hosted a visit from ISO/mm collaborators Dr. David Hughes in October 1997 during which they discussed plans for the mm collaboration and a paper on 1202-0727 ISO data. Drs Wilkes and Hooper hosted a visit from ISO/variability collaborator Dr. Thierry Courvoisier in October 1997 during which we discussed a plan of action for analysis of multiple datasets on individual objects.

Personnel

Dr. McLeod completed her three-year term as postdoctoral fellow on the ISO project in July 1997. Dr. Eric Hooper of Steward Observatory started his tenure in September 1997.